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LICHENS—UMBILICARIA.

BY CAROLYN W. HARRIS.

This is a genus of which some species are familiar to almost every one. The large, leathery looking "Rock Tripe" is one; this name is applied to several species.

It is said that many of the early explorers to the North Pole ate of this rather unpleasant looking plant and were made ill by it. Like many of the lichens it contains a small amount of nourishment.

At Chilson Lake, Essex Co., New York, five species of Umbilicaria are found, only one of which is at all rare, *U. vellea.* The others *U. Dillenii, pustulata, Muhlenbergii* and *Pennsylvanica* are common on granite rocks where there is a good deal of moisture. The family Umbilicariei has only the one genus, Umbilicaria, which by some lichenists has been divided, and certain of the species have been placed under the name of Gyrophora; this division goes back to an early date. The structure of the thallus really has very few important differences, the fruit still less, so at present it seems wise to include all the species under the name of Umbilicaria. Fries says "it is the secret of all systematic study adequately to apprehend the distinction between close affinity and superficial or subtile differences." Many important questions relating to the lichens are unsettled, just as it is with the mosses, only the difficulties seem more numerous, as less systematic work has been done on the lichens. Much can be learned regarding them nevertheless; some genera are clear and settled for the present, at least. So conscientious work on the lichens will not be lost time, and all will help to decide some of the unsettled problems. In many lines of work if we wait until the last question is settled we shall find that our chance for helping in the working out of the problems is past.

The specimens of Umbilicaria vary greatly in size, some are an inch in diameter, others nearly a foot. The thallus is horizontal and foliaceous, and is always fastened at one point to the substratum by a stalk-like disk or umbilicus. The margin is frequently torn or ragged. The prevailing color of the upper surface is brown or grayish-brown, the lower side is a very dark-brown or black, with black rhizoids or scaly layers. The apothecia are sessile upon the upper surface of the thallus and are very interesting in appearance, as well as in structure. On examination with a hand lens the disk presents a convoluted appearance: it is convex and black, the lengthwise folds or plaits are unusual looking.

The Umbilicarias are Northern in their range, but are common in the mountains of the Southern states and even in the torrid zone. When collecting them, if the atmosphere is moist they will be soft and pliable, and can be put under a light pressure until dry, then will be ready for mounting.

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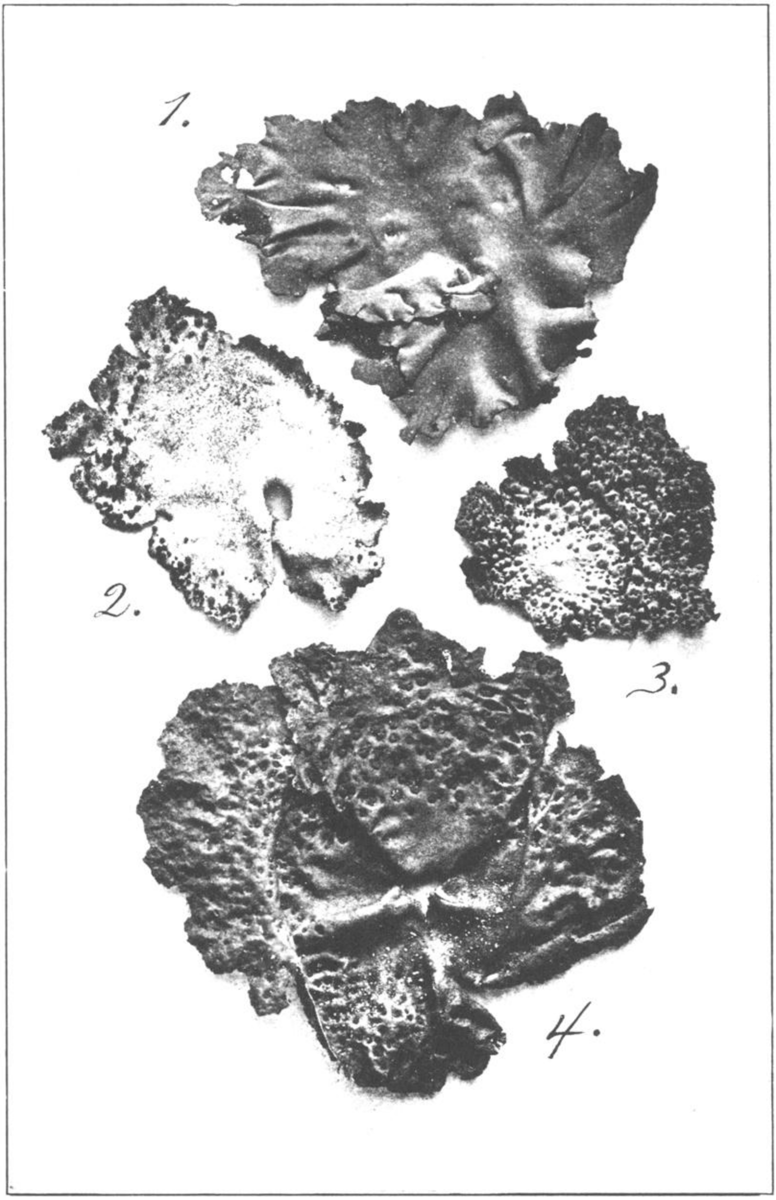

Plate IX. 1. *Umbilicaria Dillenii* 2 *U. vellea* 3. *U. pustulata*
4. *U. Muhlenbergii.*

If they are dry they are very brittle, and must be well dampened before being put in the press. When moistened the Umbilicarias are deep green, or olive-green, becoming dark gray, brown or black when dry.

The economic uses of Umbilicaria are of some importance; several species yield a useful dye. Linnaeus says "some of them are superior in nutritive qualities to the 'Iceland Moss.'" They contain a bitter purgative quality which makes the use of them for food unwise.

Umbilicaria cylindrica (L.) Delis. Thallus many leaved with round lobes, smooth and of medium size. The color is bluish or smoke-colored gray, the margin is thickly fringed with black fibrils, giving the plant a very attractive appearance. Beneath, the thallus is a pale brown, usually smooth, but some specimens have soft fibrils. The apothecia are medium, at first sessile but as they mature are elevated; they are sooty-black, orbicular, plicate or composed of tiny folds. This pretty lichen is found on alpine rocks, both in this country and Europe. In Labrador and Newfoundland it is common and usually fertile.

Umbilicaria probcscidea (L.) Stenh. Thallus one-leaved, flat and rather thin, with few lobes, which are crenate: it is rugose above, especially at the centre. In color it is blackish brown, turning blue-gray at the centre. Beneath, the thallus is smooth, naked and pale gray or pruinose; it is closely appressed to the substratum and is somewhat rigid and brittle. It is generally fertile, with numerous, small apothecia which are round.

Umbilicaria flocculosa Hoffm. The thallus is dark-brown in this species, with a rough, sooty appearance, is medium, one-leaved, thin with a scalloped margin. Some specimens are slightly papulose or squamulose, reflexed at the margin. Beneath, the thallus is lighter in color, more or less reticulated, especially at the center; it has no fibrils. The apothecia are small, flat and sessile, more numerous toward the margin of the thallus. Found on high mountains in North America, as well as in Europe.

Umbilicaria hyperborea Hoffm. Thallus usually one-leaved with jagged edges, rugose and occasionally perforate; in color brownish-black. Beneath, the thallus is dark brown, usually smooth, but some specimens are slightly pitted. The apothecia are small, oblong and plicate, with a flat, black disk. This lichen is found on rocks on high mountains and varies a good deal according to age; is common in the Rocky Mountains. The specimens are always small, and quite free from the substratum except at the one point of attachment.

Umbilicaria phæa Tuckm. Thallus small or medium, one leaved and smooth, especially toward the centre; it is reddish-brown with few lobes and uneven edges. Beneath the thallus is a pale brown, growing darker with age; it is very granulate except at the margin where it is usually smooth, has no fibrils. The apothecia are small and sunken in the thallus: they are very numerous especially near the margin. Found on rocks of the Pacific Coast and in the Rocky Mountains.

Umbilicaria erosa (Web.) Hoffm. Thallus medium in size, one-leaved, with few rounded lobes, which are filled with cracks, the edges are ragged, the entire upper surface is reticulated, the color is dark brown, almost black. The lower surface is very rough and fissured, sometimes with root-like fibrils; in color it is paler than the upper side. The apothecia are small and uneven in shape, and close to the surface of the thallus; the disk is convex and plicate. This species of Umbilicaria is not a common one, but is found in the mountains of the Eastern and Western states, also in Europe.

UMBILICARIA MUHLENBERGII (Ach.) Tuckm. Plate IX. 4. Thallus varies very much in size, is sometimes very large, with one leaf which is more or less folded, and torn at the margin; it is quite rigid even when damp; color ash-gray, darker toward the margin. Beneath, the thallus is very dark, and shaggy, with open net work, which at the margin divides into very short, stiff fibrils. The apothecia are very numerous except at the centre; they are rather large and situated in pits; disk black, convex and plicate, in finer folds than in the apothecia of some other species. This is one of the lichens which bears the popular name of "Rock Tripe."

UMBILICARIA VELLEA (L.) Nyl. Plate IX. 2. This is the most attractive in appearance of the Umbilicarias. and when found in fruit is really beautiful; its popular name is "Velvet Moss." The thallus is usually quite large, but many specimens are small, especially those in fruit. It is one-leaved, with a very irregular margin, sometimes in small scallops; the surface is smooth and powdery, is from light to dark gray in color. The lower surface is a very dark brown or black, has many rigid cilia crowded together, these cover the whole surface from centre to margin. The apothecia are in slight depressions of the thallus, very numerous near the margin, are smaller and rounder than the fruit in most of the species of Umbilicaria. This lichen is found on granite rocks in the mountains, and is not often found fertile. Fine specimens in fruit have been collected at Chilson Lake, Essex Co., New York.

UMBILICARIA DILLENII Tuckm. Plate IX. 1. This is the largest species of Umbilicaria; it is found on rocks throughout the United States. Some specimens grow to be nearly a foot in diameter, they are usually found near water and growing closely together, often over-lapping each other. The thallus is one-leaved, leathery, with an entire margin; the lobes are somewhat wrinkled. The upper surface is smooth and raised toward the centre; the color is a sooty-brown. Beneath, the thallus is very black, closely covered with stiff hair-like fibrils. The apothecia, which are rare, are medium and attached at the centre, are round and ridge-like.

UMBILICARIA CAROLINIANA Tuckm. This species is unlike the other Umbilicarias in appearance, as it is not so flat and has many leaves, the rounded lobes of which are very crowded; the surface is usually papulous; in color it is a dark, dull brown. Beneath it is very black, rough and uneven; at the margin it is smooth except for a few coarse fibrils. The apothecia are small but are so crowded together that they appear large. Found on rocks in the mountains of North Carolina and other Southern states.

UMBILICARIA PENNSYLVANICA Hoffm. Thallus medium to very large, one-leaved, leathery and very papulous, from dark gray to smoky-brown, lighter at the centre and sometimes powdery. The margin is irregular, and in the older specimens is torn. Below it is a sooty-brown or black, very granulate and deep pitted, has no fibrils. The apothecia are small and clustered in the spaces between the pustules, near the margin of the thallus. This species is found on rocks throughout the Eastern and Southern states, especially in the mountains.

UMBILICARIA PUSTULATA (L.) Hoffm. Plate IX. 3. Thallus small to medium, one-leaved, very papulous; in color ashy becoming brown, lighter at the centre and more or less powdery. In young specimens the margin is entire and slightly waved, as the plant grows older the margin breaks and appears ragged. The under surface is brown, growing lighter toward the centre; is finely granulate with deep pits. The apothecia are small and numerous, situated between the pustules of the thallus and toward the margin. The variety, *papulosa*, is so nearly like the specimens in appearance and internal structure that many lichenists include it with *pustulata*.

U. pustulata resembles *U. Pennsylvanica* very closely on the upper surface, except that in the latter the pustules are more irregular in outline, and are depressed at the centre. Beneath they are easily distinguished. *U. Pennsylvanica* is a sooty-black and is much more granulate than *U. pustulata* and the pits are not so marked.

RADULA.

By Wm. C. Barbour.

(Continued from page 47. May, 1902.)

Key.

1. Leaves closely imbricate (somewhat distant in *R. tenax*)........2.
Leaves loosely imbricate..................................7.
Leaves distant....................................*R. obconica.*
2. Stems dichotomously branching........................*R. tenax.*
Stems more or less pinnately branching.......................3.
3. Mouth of perianth entire or nearly so.........................4.
Mouth of perianth emarginate or crenate......................6.
4. Perianth compressed, not noticeably narrowed at apex..........5.
Perianth subinflated, narrowed at apex..................*R. Hallii.*
5. Perianth short, oblong-quadrate..................*R. Caloosiensis.*
Perianth long, obconic..........................*R. complanata.*
6. Perianth compressed cylindric......................*R. australis.*
Perianth funnel-form, mouth compressed..........*R. Xalapensis.*
7. Leaves flaccid, rotund oval, subrepand-dentate....*R. Sullivantii.*
Leaves subascending or semivertical, broadly obovate, entire.
R. Bolanderi.

RADULA TENAX Lindb. (*R. pallens* Sulliv.)

This species is found mostly in mountain regions, ranging from the Catskills of New York to the mountains of North Carolina. It is dioicous, with firm, rigid stems; the leaves rather remote, slightly, if at all, decurrent,